Ashley National Forest Aspen Restoration Project

Ashley National Forest
Utah and Wyoming
October 2019

1.0 INTRODUCTION

Aspen is a disproportionally important forest community in the Interior West, supporting significant biological diversity and providing increased water yields and ecosystem resiliency to fire. Aspen ecosystems can support a wide array of plant and animal species due to their high productivity and structural diversity. Many consider it the most important deciduous forest type in western North America. In addition, aspen stands play an increasingly important role in the suppression and management of wildfires because they can act as natural fuel breaks.

Many aspen populations across the west are declining due to drought, ungulate browsing, and lack of disturbance, particularly fire, requiring active restoration efforts to maintain and improve aspen forest health in the region. The primary method for aspen reproduction is suckering from the clonal root system. Therefore, any decline in aspen is concerning because the loss of aspen presence is not easily recovered and may be permanent.

The Ashley National Forest is home to large acreages of persistent and seral aspen communities; approximately 184,986 acres on the forest. This project will help maintain and improve the health of aspen communities across northern Utah and southwest Wyoming on the forest, preventing further decline.

Project website: https://www.fs.usda.gov/projects/ashley/landmanagement/projects

General Location: The Ashley National Forest covers the northeastern part of Utah and southwest Wyoming. The project area is shown in Figure 2 below.

1.1 Existing Vegetation Conditions

In the persistent aspen, where mature stands are declining, we are typically seeing successful regeneration. However, without active treatments in some of these stands, the skew towards a landscape with mature and old stands would continue for long time periods.

In the seral aspen, there is an abundance of late seral conditions and moderate to extensive colonization by conifers. We are seeing little recruitment of new aspen in these stands (Figure 1). Eventually, these stands with a conifer component would continue through succession to a conifer dominated cover type and possible the long-term loss of the aspen clone if not treated or disturbed by natural events such as fire.

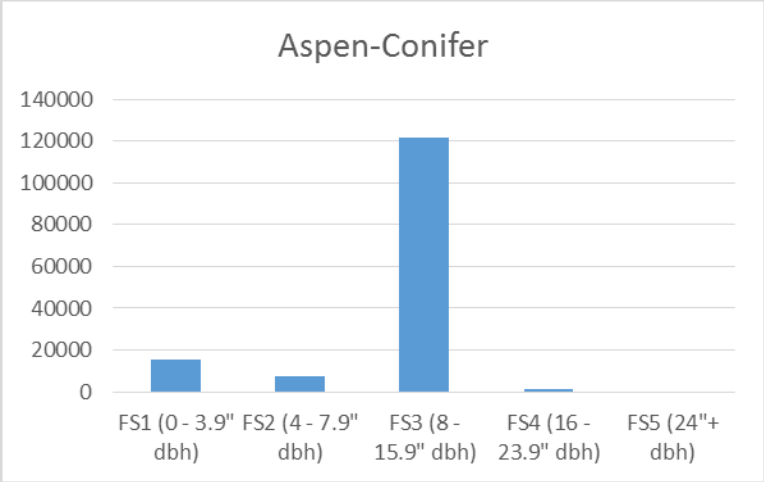

Figure 1. Acreage of seral aspen forest type on the Ashley National Forest by diameter at breast height class group.

2.0 PURPOSE AND NEED

Desired conditions for aspen on the Forest includes a heterogeneous mosaic of age classes, with young, mid, and old age classes represented across the landscape. Aspen regeneration should be sufficient to withstand browsing pressure from wildlife and livestock and still provide sufficient recruitment to ensure stand maintenance or stand replacement. Seral aspen forests would be maintained by periodic disturbance and would not be converted at large spatial scales to conifer forest due to lack of disturbance. Grass, forb, and shrub growth would be productive, providing forage and browse for both wildlife and livestock. A mosaic of healthy aspen stands of varying age classes across the landscape would provide opportunities to manage future wildfires for resource objectives and to suppress fires with undesirable fire effects. The current state of aspen in northern Utah does not meet these conditions, and there is a need for active restoration treatments.

The purpose of this project is to begin a programmatic approach to restoring aspen forests where an assessment has indicated a need for treatment with consideration of the effects of ungulate or livestock browsing. The goals and objectives of the project are to move aspen forests closer to the desired future conditions and:

1. Increase aspen resilience and improve wildlife habitat by:
    - Increasing the age-class diversity of aspen on the landscape
    - Restoring and maintaining self-replacing aspen stands
2. Increase forest resistance to uncharacteristically large and severe wildfires, and increase opportunities for managing wildfires for natural resource objectives by:
    - Expanding the extent of aspen on the landscape
    - Reducing conifers in aspen-dominated stands to reduce fire intensity

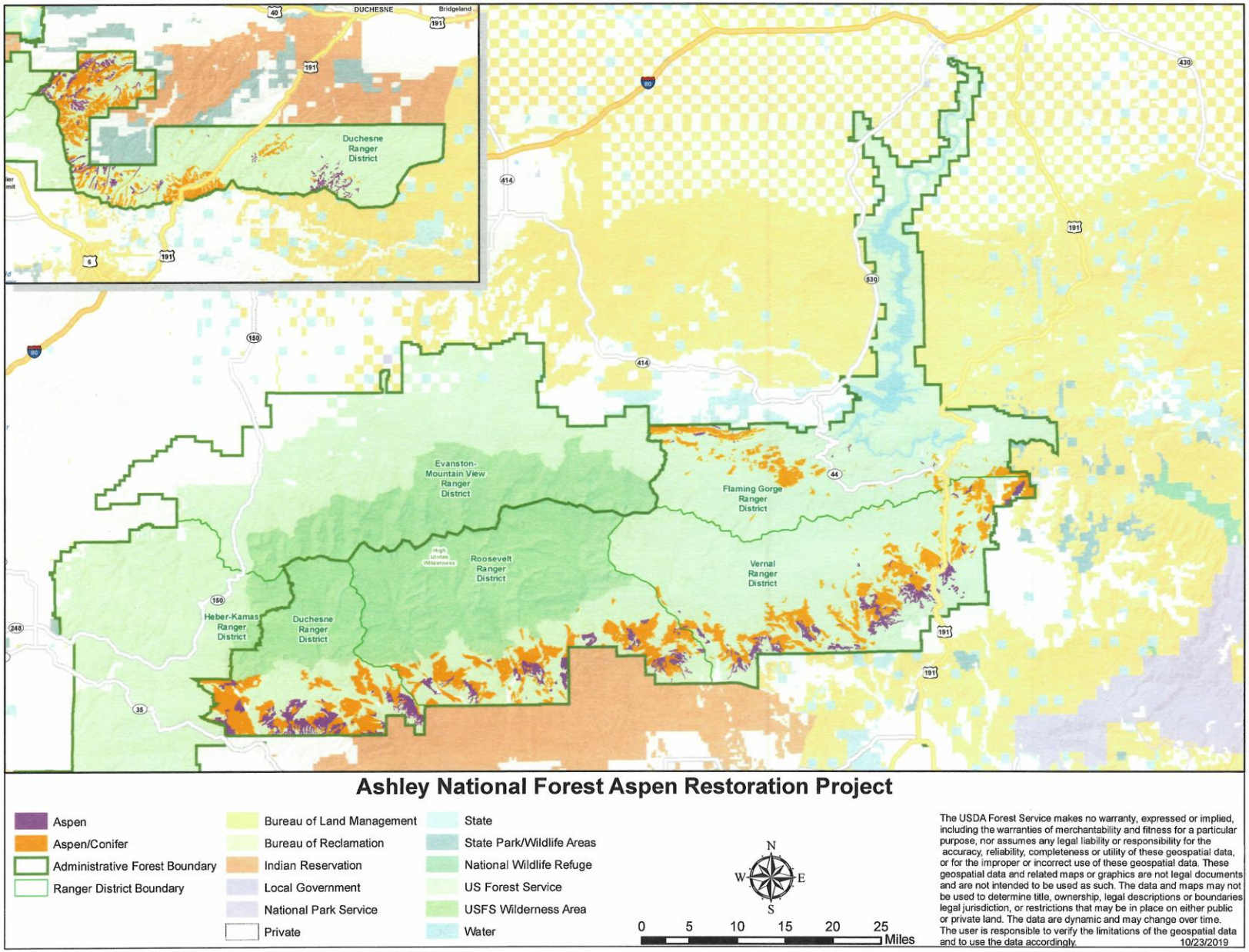

Figure 2. Project area map. Displays the aspen and aspen-conifer vegetation types on the Ashley National Forest that is outside of designated Wilderness. There are approximately 177,707 acres on the Ashley National Forest.

3.0 PROPOSED ACTION

This project would allow for treatments in any aspen community across the Ashley National Forest outside of designated Wilderness, approximately 177,707 acres. Aspen restoration may occur within Inventoried Roadless Areas (IRAs). Any tool or method used to treat aspen would be consistent with the Roadless Rule, including the cutting, sale, or removal of generally small diameter timber and that the cutting, sale, or removal must maintain or improve one or more roadless characteristics. Within any of the Research Natural Areas, no mechanical treatments would be used to treat aspen (fire only).

Over the last ten years (2009-2018), the Ashley National Forest have treated approximately 9,934 acres of aspen, averaging about 1,000 acres per year. Based on the results of implementing these projects, our team is confident that we understand the effects of the proposed treatments when applied under certain conditions. The NEPA analysis considers the effects of each of the treatments that could be implemented based on an existing condition. After the analysis is complete, specific project areas would be identified and on-the-ground assessments (Appendix B) would be completed to determine the ecological condition of the aspen stands, the potential for problems with ungulate browsing, and other local factors. Based on the site-specific conditions and an interdisciplinary review, the appropriate treatment(s) for the project area would be selected (from the list below). Treatment actions would target the most effective management option and be followed by post-treatment monitoring. Based on the monitoring results, additional management actions (from the list of treatments) may be implemented if needed to achieve restoration objectives.

Based on the results of the assessments, actions used to maintain or improve conditions for aspen may include one or more of the following:

1. Prescribed burning (broadcast) that would target aspen and aspen-conifer stands within larger project areas under predetermined weather and fuel conditions (identified in the approved project Burn Plan). Where possible, project areas would be identified to minimize ground disturbance by utilizing existing roads, trails, and terrain to contain the fire. Fire lines would be constructed if necessary.
2. Selectively cut conifers, aspen or both using hand crews with chainsaws or ground-based mechanized equipment (i.e. masticator, skid steer, skidder, etc.).
3. Removal of all aspen and conifers using hand crews with chainsaws or ground-based mechanized equipment.
4. Cut material associated with mechanical treatments may be:
    a. Left in place or moved (e.g. to act as physical barriers to protect aspen from browsing or to provide fuel for a later prescribed fire).
    b. Removed, potentially as a commercial sale (e.g. firewood, post and pole, other types of biomass material, and sawlogs).
    c. Hand or mechanically piled and later burned.
    d. Chipped or masticated.
5. Girdling conifers (killing the tree but leaving it standing) within aspen stands.
6. Root separation (breaking up lateral roots at some distance from the parent aspen trees using mechanical equipment).
7. Protection from browsing (including, but not limited to wildlife proof fencing, 6-8’ high).
8. Protection from livestock using permitted grazing practices (e.g. temporarily resting pastures or allotments, or using fencing, water and or supplements to distribute livestock away from aspen stands).
9. Planting aspen and controlling competing vegetation.
10. Inventory and monitoring.
11. No treatment.

At the site-specific project level, the following would be completed and documented in a project file:

- Map of project area
- Pre-treatment aspen assessment (Appendix B)
- Site-specific silvicultural prescription if applicable
- Burn plan if applicable

- Threatened, Endangered and sensitive plant and animal surveys and mitigation strategies
- Cultural resource surveys and mitigation strategies
- Site-specific mitigation measures
- Post-treatment monitoring
- Aspen Implementation Approval Form (Appendix C)

3.1 Design Criteria and Review Process

In order to accomplish objectives while also maintaining the appropriate level of resource protection, resource specialists have provided Best Management Practices (BMPs) and project design criteria for each treatment type listed above (Appendix A). These BMPs are based on law, regulation, and policy as well as years of experience and professional judgement from implementing these types of projects. This experience has led to years of successful treatment that has not resulted in any extraordinary circumstances.

Project activities will occur over the next 10-20 years, in various locations on the forests as needed. Assessments will be completed in prioritized areas to determine what, if any, treatment to aspen stands are needed. Prior to implementation, a site-specific interdisciplinary review will occur to identify any new information, ensure appropriate design criteria are implemented consistent with the project design, conduct field reviews for activities near sensitive sites, and complete permitting or consultation requirements. A final checklist (Appendix C) would be completed prior to implementation to ensure the appropriate site-specific mitigation measures have been developed and legal requirements have been met.

4.0 DECISION TO BE MADE

The Ashley National Forest has determined that this action may be categorically excluded from documentation in an environmental assessment or an environmental impact statement. In particular, this action falls under **Category 6: Timber stand and/or wildlife habitat improvement activities that do not include the use of herbicides or do not require more than one mile of low standard road construction (36 CFR 220.6(e)(6)).**

We consider resource conditions when determining whether extraordinary circumstances related to the proposed action exist that warrant further analysis and documentation in an environmental assessment or an environmental impact statement. As per Chapter 30, Section 31.2 of Forest Service Handbook 1909.15, the mere presence of one or more of these resource conditions does not preclude the use of a categorical exclusion. The NEPA decision would approve the treatments listed above based on implementation of BMPs listed in Appendix A. As site-specific projects are developed, resource specialists would review these projects to verify that the BMPs they outlined were included in the development of the project. The line officer responsible for the project would verify that the necessary steps were taken. A checklist to help line officers ensure this process occurs is included in Appendix C.

5.0 SCOPING

Scoping for the project will include a 30-day outreach period to the public. The project will be entered into the Planning, Appeals, and Litigation System (PALS) and information about the project will be available for review on the website for the forest.

You can comment on the project in the following ways:

- Submit comments by mail to Kristy Groves, Duchesne Ranger District, 85 W Main St., Duchesne, UT 84021. Business hours for submitting hand-delivered comments are 8 a.m. to 4:30 p.m. Monday through Friday, excluding holidays.
- Submit comments via email to comments-intermtn-ashley@fs.fed.us Electronic comments must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), .pdf, or Word (.doc).

6.0 FOREST PLAN AND LEGAL CONSISTENCY

During the development of site-specific projects, land managers would ensure compliance with the 1986 Land Resource Management Plan for the Ashley National Forest. The Forest is currently undergoing a revision to the forest plan. Once the plan is complete, any proposed projects would be required to comply with the revised plan.

Additionally, all projects will be in compliance with all applicable laws, regulations, and policies. Specifically; the National Forest Management Act, National Environmental Policy Act, Endangered Species Act of 1973, as amended; Clean Water Act; Congressional designated areas such as wilderness, wilderness study areas, or National Recreation Areas; Inventoried Roadless Areas; Research Natural Areas; Native American religious or cultural sites, archaeological sites, or historical properties or areas; Migratory Bird Treaty Act; Environmental Justice (Executive Order 12898).

7.0 OBJECTION OPPORTUNITIES AND IMPLEMENTATION

The decision for this project will not be subject to administrative appeal or objection, as outlined in the Consolidated Appropriations Act of 2014 and the Agricultural Act of 2014. Once a decision is signed, the project can be implemented immediately.

8.0 CONTACT PERSON

For additional information about the project, contact Kristy Groves at kristy.groves@usda.gov or 435-781-5203.

APPENDIX A – Best Management Practice Tables by Proposed Treatment Type

Table 1 - Prescribed burning and fireline construction.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	• Do not pile cut trees or slash within TES plant populations. • Do not apply ignition source directly within TES plant populations. • Attempt to burn when TES plant populations are dormant. • Where possible, do not construct fireline within a TES plant population. • If fireline is necessary within TES populations, construct fireline by hand or use wet line and existing features as fireline. • Rehabilitate constructed fireline after implementation as needed.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	(*Historic Properties* are cultural resources that are considered to be eligible for listing on the National Register of Historic Places) • Fireline should not be constructed through the boundaries of *Historic Properties*. • Cut trees and slash piles should not be placed and/or burned within the boundaries of Historic Properties. • Prescribed fire may or may not be allowed within the boundary of a Historic Property depending on the type of cultural resource that lies within the prescribed fire area, fuel type, and fire intensity. Coordination with Heritage Program is necessary.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	• Where possible, direct ignitions would not occur within RHCAs areas. Particularly adjacent to streams known to contain conservation populations of Colorado River cutthroat trout (CRCT) or Bonneville cutthroat trout (BCT). Backing fire would be allowed to enter these areas. If direct ignition is necessary, it will be conducted to achieve low to moderate burn severities. • Site specific boreal toad mitigation measures will be identified prior to implementation based on species presence and riparian conditions.	The presence or absence of known CRCT and BCT populations and breeding habitat of CFS and BT will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified. Surveys of woody debris would be completed prior to implementing conifer or aspen removal within RHCAs.
Hydrology/	• Where possible, direct ignitions would not occur within RHCAs areas.	• RHCAs will be delineated during treatment

Table 1 - Prescribed burning and fireline construction.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Soils	Backing fire would be allowed to enter these areas. If ignition is necessary, it will be conducted using ground-based hand ignitions methods only (drip torches, fusees, etc.) Aerial ignition devices/pistols will be restricted to areas outside of RHCAs. • While using prescribed fire in RHCAs, no fuel accelerants would be allowed to reach live water. • Prohibit burn mix storage and drip torch filling in RHCAs to minimize water quality and riparian soil impacts. • Fireline construction within RHCAs should be minimized. • Within RHCAs, firelines should be constructed perpendicular to stream channels when possible to minimize the potential for flow interception. • Following project implementation, firelines should be rehabilitated to minimize water quality impacts. • On a watershed scale, manage vegetation treatments in riparian areas to maintain stream water temperatures. • Protect plastic road culverts and ensure their ability to function.	unit planning. • BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.
Range	• Any range improvements (such as fences or cattle guards) that are damaged or taken down during implementation will be put back to Forest Service standards. • Manage livestock grazing within aspen restoration treatment areas that would facilitate sprouting and sprout survival sufficient to perpetuate the long-term viability and resilience of treated aspen stands.	
Recreation	• Public safety is a priority. If recreational activities occur in project areas, signs will be posted in advance to notify the public of project objectives and safety concerns. Temporary area closures may be necessary to protect the public. • In popular hunting areas, consider providing additional public information. Coordinate with the Utah Department of Wildlife Resources (UDWR) to	

Table 1 - Prescribed burning and fireline construction.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	ensure hunters using the area(s) are informed of the treatments. • When possible, avoid scheduling prescribed burns on opening day(s) of any major hunts or holiday weekends. • Fell hazard trees after the prescribed bun, or other treatments, if they threaten system trails, roads, campgrounds, or inventoried dispersed campsites. • Protect trail and road signs from fire.	
Timber/ Fuels	• In areas with whitebark pine, seek to improve the likelihood of survival. Where necessary, thin the stand prior to prescribed burning to prevent crown fire and assure that residual activity fuels and subsequent burning will not scorch whitebark pine crowns by more than 20-30%.	
Weeds	• For at least three years after a project is completed, treat invading noxious weeds as needed on areas impacted by ground disturbing operations. • To prevent the spread of noxious and invasive plants, revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is susceptible to or threatened by invasive or noxious plants. Seed mix will be approved by a forest service botanist or ecologist and certified weed free.	The presence or absence of noxious and invasive plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Wildlife	• Within goshawk territories, leave a minimum of 600 snags/100 acres (6 snags/acre) 8" dbh > 15 feet tall. If the minimum number of snags is unavailable, green trees should be substituted. If the minimum size is unavailable, then use largest trees available on site. • In aspen stands, retain a minimum of 50 downed logs/10 acres 6" dbh > 8 feet in length or 30 tons/10 acres of coarse woody debris >3" in diameter. These habitat components should be present at the stand level on average and, where they are available, distributed over each treated 10 acres.	The presence or absence of TES populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified. Known goshawk nests will be checked for occupancy prior to project implementation. Complete surveys for territory occupancy within suitable habitat. These surveys will be completed during the nesting and/or post fledgling period and must be conducted at

Table 1 - Prescribed burning and fireline construction.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• Prohibit vegetative treatments within active northern goshawk nest areas (approximately 30 acres) during nesting periods (March 1 –September 30). • Work associated with treatments in aspen stands that occur adjacent to sage-grouse habitat will comply with the current sage-grouse amendment. Site specific measures may be identified.	least one year prior to implementation of management actions.

Table 2 - Selectively cut or remove all conifers, aspen or both using hand crews with chainsaws.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	• Fell trees away from TES populations where possible within the project area.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	• Trees should not be felled in a manner that impacts *Historic Properties*. • In some cases (example: arborglyphs, bow stave trees, cultural cambium removal), the trees themselves could be a contributing feature to a *Historic Property*. In these cases, the tree(s) should not be cut.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	• Do not remove conifers or aspen in RHCAs except where present and future woody debris needs are met (based on the relevant Forest Plan) and significant adverse effects on populations of aquatic organisms can be avoided. Site specific mitigation measures may be developed to address that concern. • Do not fell trees into streams, lakes or bogs except when needed to improve aquatic habitat. Trees may be felled in RCHAs when they pose a significant safety risk. Keep felled trees on site when needed to provide large woody debris. • Do not conduct tree removal activities in a manner that would allow debris or slash to enter stream channels. • Use special harvesting techniques to protect riparian zones, such as directional felling and cable yarding when needed to protect riparian ecosystems. • Do not place landings or decking areas within riparian areas or on areas	The presence or absence of known CRCT and BCT populations and breeding habitat of BT will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified. Surveys of woody debris would be completed prior to implementing conifer or aspen removal within RHCAs.

Table 2 - Selectively cut or remove all conifers, aspen or both using hand crews with chainsaws.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	where surface runoff will discharge directly into the stream channel or within RHCAs. • To ensure natural and beneficial volumes of large woody debris, downed dead trees should not be removed from streams. • Site specific boreal toad mitigation measures will be identified prior to implementation based on species presence and riparian conditions.	
Hydrology/ Soils	• A minimum of 50 down logs per 10 acres, with a minimum 12-inch mid-point diameter and eight-foot length, would be retained across the treatment units. If the minimum size is unavailable, the largest logs available on site would be retained. • Trees adjacent to stream channels that provide bank stability or contribute to channel integrity will not be removed unless approved by the forest hydrologist. Removal of hazard trees will be permitted. • On a watershed scale, manage vegetation treatments in riparian areas to maintain stream water temperatures. • Scatter, distribute, or spread timber/brush slash and litter over the skid trails and landings to protect the soil surface from erosion and to maintain organic matter on site. • Servicing, storage, and fueling of equipment would occur outside of RHCAs. • Storage of fuels, lubricants, toxicants, and hazardous materials is prohibited within RHCAs.	RHCAs will be delineated during treatment unit planning. BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.
Range	• Any range improvements (such as fences or cattle guards) that are damaged or taken down during implementation will be put back to Forest Service standards. • Manage livestock grazing within aspen restoration treatment areas that would facilitate sprouting and sprout survival sufficient to perpetuate the long-term viability and resilience of treated aspen stands.	

Table 2 - Selectively cut or remove all conifers, aspen or both using hand crews with chainsaws.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Recreation	• Minimize cut tree stump heights to six inch maximum when measured from the uphill side, when cut stumps are visible in foreground views from FS System roads and trails. • Public safety is a priority. If recreational activities occur in project areas, signs will be posted in advance to notify the public of project objectives and safety concerns. Temporary area closures may be necessary to protect the public. • In popular hunting areas, consider providing additional public information. Coordinate with the Utah Department of Wildlife Resources (UDWR) to ensure hunters using the area(s) are informed of the treatments.	
Timber/ Fuels	• When treating aspen, if the treatment type is coppice or group selection, consider leaving a minimum of 2-5 TPA of the largest aspen (Shepperd et al. 2006). Left aspen should be the healthiest and phenologically best trees in the openings. Emphasis should be on removing conifer where present and promoting aspen.	
Weeds	• All noxious and invasive plant populations found within the project area will be treated prior to project implementation. For at least three years after a project is completed, treat invading noxious weeds as needed on areas impacted by ground disturbing operations. • To prevent the spread of noxious and invasive plants, revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is susceptible to or threatened by invasive or noxious plants. Seed mix will be approved by a forest service botanist or ecologist and certified weed free.	
Wildlife	• Within goshawk territories, leave a minimum of 600 snags/100 acres (6 snags/acre) 8" dbh > 15 feet tall. If the minimum number of snags is unavailable, green trees should be substituted. If the minimum size is unavailable, then use largest trees available on site.	The presence or absence of TES populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.

Table 2 - Selectively cut or remove all conifers, aspen or both using hand crews with chainsaws.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• In aspen stands retain a minimum of 50 downed logs/10 acres 6" dbh > 8 feet in length or 30 tons/10 acres of coarse woody debris >3" in diameter. These habitat components should be present at the stand level on average and, where they are available, distributed over each treated 10 acres. • Prohibit vegetative treatments within active northern goshawk nest areas (approximately 30 acres) during nesting periods (March 1 –September 30). • Work associated with treatments in aspen stands that occur adjacent to sage-grouse habitat will comply with the current sage-grouse amendment. Site specific measures may be identified.	Known goshawk nests will be checked for occupancy prior to project implementation. Complete surveys for territory occupancy within suitable habitat. These surveys will be completed during the nesting and/or post fledgling period, and must be conducted at least one year prior to implementation of management actions.

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	• Do not stage or operate heavy equipment within TES populations. • Fell trees away from TES populations where possible within the project area.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	• Mechanical treatment, vehicle staging, and/or ground disturbance activities should generally not be implemented within the boundaries of *Historic Properties* unless recommended by Heritage Program. • In some cases (example: arborglyphs, bow stave trees, cultural cambium removal), the trees themselves could be a contributing feature to a *Historic Property*. In these cases, the tree(s) should not be cut.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
		resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	• Do not remove conifers or aspen in RHCAs except where present and future woody debris needs are met (based on the relevant Forest Plan) and significant adverse effects on populations of aquatic organisms can be avoided. Site specific mitigation measures may be developed to address that concern. • Site specific boreal toad mitigation measures will be identified prior to implementation based on species presence and riparian conditions. • Do not fell trees into streams, lakes or bogs except when needed to improve aquatic habitat. Trees may be felled in RCHAs when they pose a significant safety risk. Keep felled trees on site when needed to provide large woody debris. • Do not conduct tree removal activities in a manner that would allow debris or slash to enter stream channels. • Use special harvesting techniques to protect riparian zones, such as directional felling and cable yarding when needed to protect riparian ecosystems. • Do not place landings or decking areas within riparian areas or on areas where surface runoff will discharge directly into the stream channel or within RHCAs.	Surveys of woody debris would be completed prior to implementing conifer or aspen removal within RHCAs.
Hydrology/ Soils	• Equipment operation would be limited to slopes less than 40%. • Skid trails, staging and landing areas will be rehabilitated as needed to ensure closure, proper hydrologic function, alleviate soil compaction and soil retention. • Equipment will not be used if ruts deeper than 6” are expected or are being created.	RHCAs will be delineated during treatment unit planning. BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• When using a tracked machine, the operator shall work in long, linear swaths to the extent practicable to avoid unnecessary pivoting and turning. Pivots and turns cause the majority of soil displacement damage. • When using equipment with a boom-mounted implement, the operator should plan off-trail travel paths to make full use of the machine's capability (e.g., using the full boom reach of the machine) to limit ground disturbance and minimize the number of off-trail passes needed to achieve treatment objectives. • Scatter, distribute, or spread timber/brush slash and litter over the skid trails and landings to protect the soil surface from erosion and to maintain organic matter on site. • A minimum of 50 down logs per 10 acres, with a minimum 12-inch mid-point diameter and eight-foot length, would be retained across the treatment units. If the minimum size is unavailable, the largest logs available on site would be retained. • Trees adjacent to stream channels that provide bank stability or contribute to channel integrity will not be removed unless approved by the forest hydrologist. Removal of hazard trees will be permitted. • Servicing, storage, and fueling of equipment would occur outside of RHCAs. • Storage of fuels, lubricants, toxicants, and hazardous materials is prohibited within RHCAs. • Equipment exclusion zones (EEZ) will be established within defined Riparian Habitat Conservation Areas (RHCA) under the following specifications (adjusted by forest hydrologist): 300' RHCAs will have a 100' EEZ; 200' RHCAs will have a 75' EEZ; 150' RHCAs will have a 50' EEZ; 100' and 50' RHCAs will have a 25' EEZ. Equipment may operate within the EEZ if on an existing road. With consultation with the forest hydrologist	Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	EEZs may be adjusted on a site specific basis. • Equipment that can reach into the EEZ to treat vegetation will be allowed to do so, however the tracks of the machine are to remain outside of the EEZ. • Equipment operation within RHCAs will be limited to slopes less than 25%. • Landings and skid trails will not be constructed within RHCAs. If this is not attainable due to localized terrain constraints, consultation with the Forest Hydrologist or Soil Scientist will be required on a case by case basis. • Directional falling and end line winching may be used to remove trees under dry conditions if boles are not producing ruts that will channel overland flow into stream channels. • On a watershed scale, manage vegetation treatments in riparian areas to maintain stream water temperatures.	
Range	• Any range improvements (such as fences or cattle guards) that are damaged or taken down during implementation will be put back to Forest Service standards. • Manage livestock grazing within aspen restoration treatment areas that would facilitate sprouting and sprout survival sufficient to perpetuate the long-term viability and resilience of treated aspen stands.	
Recreation	• Minimize cut tree stump heights to six inch maximum when measured from the uphill side, when cut stumps are visible in foreground views from FS System roads and trails. • Public safety is a priority. If recreational activities occur in project areas, signs will be posted in advance to notify the public of project objectives and safety concerns. Temporary area closures may be necessary to protect the public. • In popular hunting areas, consider providing additional public information.	

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	Coordinate with the Utah Department of Wildlife Resources (UDWR) to ensure hunters using the area(s) are informed of the treatments.	
Timber/ Fuels	• When treating aspen, if the treatment type is coppice or group selection, consider leaving a minimum of 2-5 TPA of the largest aspen (Shepperd et al. 2006). Left aspen should be the healthiest and phenologically best trees in the openings. Emphasis should be on removing conifer where present and promoting aspen.	
Weeds	• All noxious and invasive plant populations found within the project area will be treated prior to project implementation. For at least three years after a project is completed, treat invading noxious weeds as needed on areas impacted by ground disturbing operations. • To prevent the spread of noxious and invasive plants, revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is susceptible to or threatened by invasive or noxious plants. Seed mix will be approved by a forest service botanist or ecologist and certified weed free.	
Wildlife	• Within goshawk territories, leave a minimum of 600 snags/100 acres (6 snags/acre) 8" dbh > 15 feet tall. If the minimum number of snags is unavailable, green trees should be substituted. If the minimum size is unavailable, then use largest trees available on site. • In aspen stands retain a minimum of 50 downed logs/10 acres 6" dbh > 8 feet in length or 30 tons/10 acres of coarse woody debris >3" in diameter. These habitat components should be present at the stand level on average and, where they are available, distributed over each treated 10 acres.	The presence or absence of TES populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified Known goshawk nests will be checked for occupancy prior to project implementation. Complete surveys for territory occupancy within suitable habitat. These surveys will be completed during the nesting and/or post fledgling period, and must be conducted at

Table 3 - Selectively cut or remove all conifers, aspen or both using ground-based mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• Prohibit vegetative treatments within active northern goshawk nest areas (approximately 30 acres) during nesting periods (March 1 –September 30). • Work associated with treatments in aspen stands that occur adjacent to sage-grouse habitat will comply with the current sage-grouse amendment. Site specific measures may be identified.	least one year prior to implementation of management actions.

Table 4 - Cut material left in place or moved. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	N/A	
Cultural	N/A	
Fisheries	N/A	
Hydrology/Soils	N/A	
Range	N/A	
Recreation	N/A	
Timber/Fuels	N/A	
Weeds	N/A	
Wildlife	N/A	

Table 5 - Cut material removed. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	N/A	
Cultural	N/A	
Fisheries	• To ensure natural and beneficial volumes of large woody debris, downed dead trees should not be removed from fish-bearing streams.	
Hydrology/ Soils	• In order to minimize soil disturbance, designated skid trails would be used in any material removal. Where feasible, skid trails from past harvest or other user created travel ways would be utilized to minimize surface area impacted by new disturbances.	
Range	N/A	
Recreation	N/A	
Timber/ Fuels	• When heavy browse pressure would prevent regeneration and attainment of minimum stocking, use cut to length removal systems to leave slash in	

Table 5 - Cut material removed. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	place where feasible. Leaving slash in aspen has been shown to improve the regeneration outlook.	
Weeds	N/A	
Wildlife	N/A	

Table 6 - Cut material hand or mechanically piled and later burned. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	• Do not pile cut trees or slash within TES plant populations.	
Cultural	N/A	
Fisheries	• Slash piles built by hand will be built at least 25' away from stream channels, ponds/lakes/reservoirs, springs, and seeps.	
Hydrology/ Soils	• A minimum of 50 down logs per 10 acres, with a minimum 12-inch mid-point diameter and eight-foot length, would be retained across the treatment units. If the minimum size is unavailable, the largest logs available on site would be retained. • While using prescribed fire in RHCAs, no fuel accelerants would be allowed to reach live water. • Prohibit burn mix storage and drip torch filling in RHCAs to minimize water quality and riparian soil impacts. • Ignitions within RHCAs will conducted using ground-based hand ignitions methods only (drip torches, fusees, etc.) Aerial ignition devices/pistols will be restricted to areas outside of RHCAs.	
Range	N/A	
Recreation	N/A	
Timber/	• Locate burn piles at least one tree length from the dripline of residual	

Table 6 - Cut material hand or mechanically piled and later burned. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Fuels	aspen where feasible. • Piles should be free of dirt (<5%). Piles should be as large as possible and located 1 ½ times the diameter of the pile away from leave trees in order to prevent scorch or damage to leave trees.	
Weeds	N/A	
Wildlife	N/A	

Table 7 - Cut material chipped or masticated. (Tables 4-7 cover actions that would occur after a mechanical treatment. Therefore, design criteria that are addressed in Tables 2 and 3 are not repeated below).		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	N/A	
Cultural	N/A	
Fisheries	N/A	
Hydrology/Soils	N/A	
Range	N/A	
Recreation	N/A	
Timber/Fuels	Desired depth of masticated material will average <2”-6” over the treatment unit.	
Weeds	N/A	
Wildlife	N/A	

Table 8 - Girdling conifers.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	Avoid girdling trees within TES plant populations that benefit from canopy cover.	The presence or absence of TES plant populations will be determined based on

Table 8 - Girdling conifers.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
		existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	Trees that could fall into the boundaries of *Historic Properties* should not be girdled.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	N/A	
Hydrology/ Soils	• Trees adjacent to stream channels that provide bank stability or contribute to channel integrity will not be removed. Removal of hazard trees will be permitted. • Servicing, storage, and fueling of equipment would occur outside of RHCAs. • Storage of fuels, lubricants, toxicants, and hazardous materials is prohibited within RHCAs. • On a watershed scale, manage vegetation treatments in riparian areas to maintain stream water temperatures.	RHCAs will be delineated during treatment unit planning. BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.
Range	N/A	
Recreation	N/A	

Table 8 - Girdling conifers.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Timber/ Fuels	N/A	
Weeds	N/A	
Wildlife	• Within goshawk territories, leave a minimum of 600 snags/100 acres (6 snags/acre) 8" dbh > 15 feet tall. If the minimum number of snags is unavailable, green trees should be substituted. If the minimum size is unavailable, then use largest trees available on site. • In aspen stands retain a minimum of 50 downed logs/10 acres 6" dbh > 8 feet in length or 30 tons/10 acres of coarse woody debris >3" in diameter. These habitat components should be present at the stand level on average and, where they are available, distributed over each treated 10 acres. • Prohibit vegetative treatments within active northern goshawk nest areas (approximately 30 acres) during nesting periods (March 1 –September 30). • Work associated with treatments in aspen stands that occur adjacent to sage-grouse habitat will comply with the current sage-grouse amendment. Site specific measures may be identified.	The presence or absence of TES populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified. Known goshawk nests will be checked for occupancy prior to project implementation. Complete surveys for territory occupancy within suitable habitat. These surveys will be completed during the nesting and/or post fledgling period, and must be conducted at least one year prior to implementation of management actions.

Table 9 - Root separation using mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	Do not perform root separation directly within TES populations.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.

Table 9 - Root separation using mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Cultural	Ground disturbance and/or mechanical treatments should not take place within the boundaries of *Historic Properties*.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	N/A	
Hydrology/ Soils	• Equipment operation would be limited to slopes less than 40%. • Equipment will not be used if ruts deeper than 6" are expected or are being created. • When using a tracked machine, the operator shall work in long, linear swaths to the extent practicable to avoid unnecessary pivoting and turning. Pivots and turns cause the majority of soil displacement damage. • Servicing, storage, and fueling of equipment would occur outside of RHCAs. • Storage of fuels, lubricants, toxicants, and hazardous materials is prohibited within RHCAs. • Equipment exclusion zones (EEZ) will be established within Forest Plan defined Riparian Habitat Conservation Areas (RHCA) under the following specifications (adjusted by forest hydrologist): 300' RHCAs will have a 100' EEZ; 200' RHCAs will have a 75' EEZ; 150' RHCAs will have a 50' EEZ; 100' and 50' RHCAs will have a 25' EEZ. Equipment may operate within the EEZ if on an existing road. With consultation with the forest hydrologist EEZs may be adjusted on a site specific basis. • Equipment that can reach into the EEZ to treat vegetation will be allowed to do so, however the tracks of the machine are to remain outside of the	RHCAs will be delineated during treatment unit planning. BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.

Table 9 - Root separation using mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	EEZ. • Equipment operation within RHCAs will be limited to slopes less than 25%.	
Range	• Any range improvements (such as fences or cattle guards) that are damaged or taken down during implementation will be put back to Forest Service standards. • Manage livestock grazing within aspen restoration treatment areas that would facilitate sprouting and sprout survival sufficient to perpetuate the long-term viability and resilience of treated aspen stands.	
Recreation	N/A	
Timber/ Fuels	• A single pass of the ripper along the edge of existing trees should be sufficient to isolate roots and stimulate suckering. Multiple passes may excessively injure roots and result in diminished suckering. Care should be taken if root diseases are present as ripping will provide entry ways for disease (Shepperd et al. 2006)	
Weeds	• All noxious and invasive plant populations found within the project area will be treated prior to project implementation. For at least three years after a project is completed, treat invading noxious weeds as needed on areas impacted by ground disturbing operations. • To prevent the spread of noxious and invasive plants, revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is susceptible to or threatened by invasive or noxious plants. Seed mix will be approved by a forest service botanist or ecologist and certified weed free.	The presence or absence of noxious and invasive plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Wildlife	• Within goshawk territories, leave a minimum of 600 snags/100 acres (6 snags/acre) 8” dbh > 15 feet tall. If the minimum number of snags is unavailable, green trees should be substituted. If the minimum size is unavailable, then use largest trees available on site.	The presence or absence of TES populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.

Table 9 - Root separation using mechanized equipment.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• In aspen stands retain a minimum of 50 downed logs/10 acres 6" dbh > 8 feet in length or 30 tons/10 acres of coarse woody debris >3" in diameter. These habitat components should be present at the stand level on average and, where they are available, distributed over each treated 10 acres. • Prohibit vegetative treatments within active northern goshawk nest areas (approximately 30 acres) during nesting periods (March 1 –September 30). • Work associated with treatments in aspen stands that occur adjacent to sage-grouse habitat will comply with the current sage-grouse amendment. Site specific measures may be identified.	Known goshawk nests will be checked for occupancy prior to project implementation. Complete surveys for territory occupancy within suitable habitat. These surveys will be completed during the nesting and/or post fledgling period, and must be conducted at least one year prior to implementation of management actions.

Table 10 - Protection from browsing.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	Do not build exclusion fencing through TES plant populations.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	N/A	
Fisheries	N/A	
Hydrology/ Soils	• Servicing, storage, and fueling of equipment would occur outside of RHCAs. • Storage of fuels, lubricants, toxicants, and hazardous materials is prohibited within RHCAs.	RHCAs will be delineated during treatment unit planning. BMP implementation and

Table 10 - Protection from browsing.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	• Ground disturbance will be minimized in wetland and riparian areas. • Any use of fencing will minimize trailing across wetland and riparian areas and should be minimized in RHCAs.	effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.
Range	N/A	
Recreation	N/A	
Timber/Fuels	N/A	
Weeds	N/A	
Wildlife	N/A	

Table 11 - Protection from livestock using permitted grazing practices.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	Do not build exclusion fencing through TES plant populations.	The presence or absence of TES plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	Historic Properties should be fenced when the type of the resource could be adversely affected by livestock grazing/watering.	The presence or absence of *Historic Properties* within the Area of Potential Effect (APE) for this proposed undertaking will be

Table 11 - Protection from livestock using permitted grazing practices.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
		assessed through the review of existing literature, previous cultural resource inventories, previously recorded cultural resources, and the initiation of cultural resource field inventories where appropriate.
Fisheries	N/A	
Hydrology/ Soils	Ground disturbance will be minimized in wetland and riparian areas.	BMP implementation and effectiveness will be monitored using USFS National BMP Monitoring Protocols and/or USFS Forest Soil Disturbance Monitoring Protocol. Monitoring will be completed on units with specific resource concerns and monitoring objectives or units that have been randomly selected from a pool of units that meet the monitoring protocol criteria.
Range	N/A	
Recreation	N/A	
Timber/Fuels	N/A	
Weeds	N/A	
Wildlife	N/A	

Table 12 - Planting aspen and controlling competing vegetation.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	Do not plant aspen directly within TES plant populations.	The presence or absence of TES plant

Table 12 - Planting aspen and controlling competing vegetation.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
		populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Cultural	N/A	
Fisheries	N/A	
Hydrology/ Soils	• Ground disturbance will be minimized in wetland and riparian areas. • Consult a Forest Service Hydrologist before utilizing chemical treatments within the RHCA.	
Range	• Any range improvements (such as fences or cattle guards) that are damaged or taken down during implementation will be put back to Forest Service standards. • Manage livestock grazing within aspen restoration treatment areas that would facilitate sprouting and sprout survival sufficient to perpetuate the long-term viability and resilience of treated aspen stands.	
Recreation	N/A	
Timber/Fuels	N/A	
Weeds	All noxious and invasive plant populations found within the project area will be treated prior to project implementation. For at least three years after a project is completed, treat invading noxious weeds as needed on areas impacted by ground disturbing operations.	The presence or absence of noxious and invasive plant populations will be determined based on existing GIS data and field surveys (as needed) after a specific project area has been identified.
Wildlife	N/A	

Table 13 - Inventory and monitoring.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
Botany	N/A	
Cultural	A sample of Historic Properties that have been avoided through	Field Monitoring.

Table 13 - Inventory and monitoring.		
Resource	**Design Criteria/BMP**	**Site-Specific Verification**
	mitigation should be monitored after implementation to ensure BMPs were implemented.	
Fisheries	N/A	
Hydrology/Soils	N/A	
Range	N/A	
Recreation	N/A	
Timber/Fuels	N/A	
Weeds	N/A	
Wildlife	N/A	

APPENDIX B - SITE ASSESSMENT FORM

Northern Utah Aspen Assessment Field Form
Pre- and Post-Treatment

PLOT INFORMATION

Project:	*Stand ID or Assessment Area:*	*Plot #:*	*Date:*
Plot Size[1]:	*Plot Shape:*	*Examiner:*	
GPS Point (DATUM):	*Latitude:*	*Longitude:*	
UTM Zone:	*UTM Northing:*	*UTM Easting:*	
Photos: 0º 90º 180º 270º	*Additional Photos (azimuths):*		
Slope (%):	*Aspect (degrees):*	*Elevation (ft):*	
Aspen Community Type (optional):*			
Aspen Type[2] (Select One): Persistent Seral Riparian			

*See *Aspen Community Types of the Intermountain Region* (Mueggler 1988)

VEGETATION DATA[3]

Aspen Regen Density, live (stems/ac)*	<500/ac	500-1,000/ac	1,000-5,000/ac	5,000-10,000/ac	10,000-20,000/ac	>20,000/ac
Aspen Regen Avg Height (ft)			*% Browsed[4]*	<20%	20-30%	30-40%	>40%
*Aspen Recruitment** Density, live (stems/ac)*	<500/ac	500-1,000/ac	>1,000/ac			
Aspen Recruitment Avg Height (ft)			*% Browsed*	<20%	20-30%	30-40%	>40%

*Aspen regen = stems <6 ft tall; ** Aspen recruitment = stems >6 ft tall and < 2" DBH

Total aspen cover, live (%)	<10%	10-25%	26-40%	41-60%	>60%		
Total conifer cover, live (%)	<10%	10-25%	26-40%	41-60%	>60%		
Mature aspen density, live & dead (trees >2" DBH /ac)	<50	50-100	100-200	200-300	>300	*% Mortality*	
Mature conifer density, live & dead (trees >5" DBH /ac)	<50	50-100	100-200	200-300	>300	*% Mortality*	
Dominance (Taller Spp.)	Aspen	Co-dominant	Conifer	*Dominant Conifer Spp:*			

Live trees only	*Avg Height (ft) (Round to nearest 10')*	*Avg DBH (in) (Round to nearest 1")*	*Density (trees/ac) (Use density ranges listed above)*	*% Cover*
Aspen cohort[5] 1				
Aspen cohort 2				
Aspen cohort 3				
Conifer <8" DBH				
Conifer >8" DBH				

Understory cover (%) (Round to nearest 5%)	*Shrubs:*		*Grasses:*	*Forbs:*	
Sagebrush cover (%)	<15%	>15%	*Common juniper cover (%)*	<15%	>15%
Noxious weeds present	Yes / No	*Type and % cover:*			

Remarks/Notes (insects & diseases present, recent dead or red needle, treatment recommendations, etc…)

This Aspen Assessment Field Form provides guidelines for the minimum data collection needed for each project implemented under the Northern Utah Aspen Restoration Project NEPA Decision to rapidly assess aspen conditions. This form should also be used for post-treatment monitoring.

Sampling Guidelines: It is recommended that at least 3-4 plots be sampled for each stand or assessment area. Stands/assessment areas should be delineated around areas of homogeneous vegetation. Not all stands within a treatment area need to be sampled but stands should represent the landscape within the project area. Plot locations should be selected in order to represent the general conditions of the stand.

1. Plot Size: Recommend a 0.1 acre circular fixed plot (37.2' radius).
2. Aspen Types:
    a. *Persistent* (aka stable or pure aspen) - Aspen dominates the overstory in all stages of succession, and regeneration and recruitment are generally continuous or pulsed but may also be episodic. Conifers are absent, or, if they are present, they have minimal impact on aspen or understory species. Stands range in size and connectivity from small isolated stands to large, more or less continuous stands.
    b. *Seral*- Found on sites favorable for conifer recruitment and growth and co-occurs with one or more conifer species. The relative abundance of aspen and conifers depends on the time since last disturbance—aspen dominates early stages and conifers dominate late stages of succession.
    c. *Riparian*- Riparian aspen grows in soils that are affected by their proximity to surface water. Conifer abundance and importance and successional processes vary.
3. Measuring Vegetation:
    a. Vegetation data may be measured with ocular estimates (using photo series resources or expert judgement) or according to the Forest's current monitoring protocols (e.g. Common Stand Exam protocols). Care should be taken to determine the presence or absence of aspen shoots 'hidden' within shrub canopies or clipped near ground level.
4. Measuring Browsing:
    a. Ocular estimate of the percentage of all leaders within 6 vertical inches of the tallest leader showing evidence of recent browse.
5. Cohort (age class) = a distinct aggregation of trees originating from a single natural event or regeneration activity.

Post-Treatment Monitoring

- Revisit the project area within 1-3 years post-treatment. Ideally, revisit the pre-treatment plots, complete the field form, and take post-treatment photos. If this is not possible, complete a walk-through survey and document aspen conditions using the field form.
- Below is a table of suggested browsing thresholds (*Browsing Thresholds and Adaptive Management Pursuant to Aspen Restoration on Monroe Mountain*, 2014) depending on the initial post-treatment sprouts/ac. If these thresholds are exceeded, consider additional management actions to protect the aspen regeneration and how the scale and timing of future treatments may be adjusted to avoid heavy browsing pressure. The thresholds should be adapted as necessary on the basis of observed success in stand recruitment.

Initial sprouts/ac	<5,000 sprouts/ac	5,000-10,000 sprouts/ac	10,000-20,000 sprouts/ac	> 20,000 sprouts/ac
Suggested browsing threshold	20%	27%	36%	45%

APPENDIX C – ASPEN IMPLEMENTATION APPROVAL FORM

The Aspen Implementation Approval Form documents that site-specific factors have been considered and mitigation measures developed for each project implemented under the Northern Utah Aspen Restoration Project NEPA Decision. The appropriate Line Officer must complete this form to authorize the implementation of aspen restoration actions.

Check that the following items have been completed:

- ☐ Project Map.
- ☐ Pre-treatment Aspen Assessment Field Forms.
- ☐ Silvicultural prescription (if applicable).
- ☐ Burn Plan (if applicable).
- ☐ Surveys have been conducted (as needed) for Threaten, Endangered and sensitive plants and animals, and site-specific mitigation measures have been developed.
- ☐ Surveys have been conducted (as needed) for cultural resources, and site-specific mitigation measures have been developed.
- ☐ National Historic Preservation Act Section 106 compliance is complete.
- ☐ Other site-specific mitigation measures have been developed (as needed).

_____ _____

RESPONSIBLE OFFICIAL NAME **Date**
TITLE
UNIT

APPENDIX D – Project Maps